UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,162,102 B2
APPLICATION NO. : 10/025357
DATED : January 9, 2007
INVENTOR(S) : Cahill et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

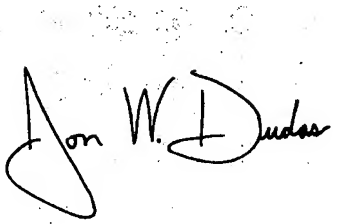
Delete Title page illustrating a figure(s), and substitute therefor, new Title page illustrating a figure(s). (attached)

Delete drawing sheet 1-10, and substitute therefor drawing sheet 1-10. (attached)

Claim 10, Column 21, Line 48	In Claim 10, after "ratio is" insert -- one of --.
Claim 19, Column 23, Line 1	In Claim 19, delete "5," and insert -- 18, --, therefor.
Claim 25, Column 24, Lines 33-39	In Claim 25, after "digital image" delete "and wherein the source digital images have pixel values that are linearly or logarithmically related to scene intensity and the step of providing source digital images further comprises applying a metric exposure transform to a source digital image such that the pixel values of the source digital image are changed by said transform and are linearly or logarithmically related to scene intensity".

Signed and Sealed this

Fourth Day of September, 2007



JON W. DUDAS
Director of the United States Patent and Trademark Office

(12) **United States Patent**
Cahill et al.

(10) **Patent No.: US 7,162,102 B2**
(45) **Date of Patent: Jan. 9, 2007**

(54) **METHOD AND SYSTEM FOR COMPOSITING IMAGES TO PRODUCE A CROPPED IMAGE**

(75) Inventors: **Nathan D. Cahill**, West Henrietta, NY (US); **Lawrence A. Ray**, Rochester, NY (US)

(73) Assignee: **Eastman Kodak Company**, Rochester, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 610 days.

(21) Appl. No.: **10/025,357**

(22) Filed: **Dec. 19, 2001**

(65) **Prior Publication Data**

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(51) **Int. Cl.**
G06K 9/36 (2006.01)

(52) **U.S. Cl.** **382/288**; 382/284

(58) **Field of Classification Search** 382/284, 382/153, 294, 167, 159, 288; 348/441–459, 348/556; 396/436

See application file for complete search history.

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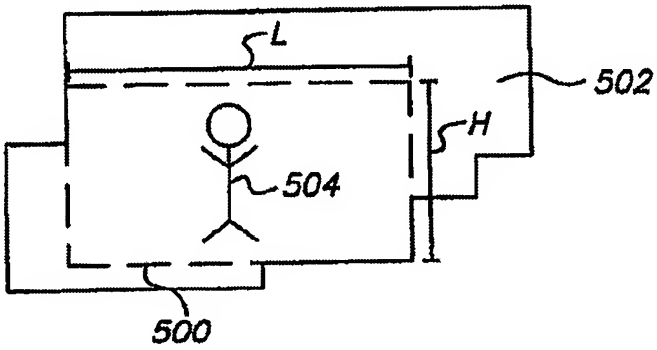
(Continued)

Primary Examiner—Daniel Miriam
Assistant Examiner—Dennis Rosario
(74) *Attorney, Agent, or Firm*—Thomas H. Close

(57) **ABSTRACT**

A method for producing a cropped digital image, includes the steps of: providing a plurality of partially overlapping source digital images; providing a cropping aspect ratio L:H, the cropping aspect ratio being the ratio of the length to the height of the cropped digital image; providing a cropping criterion, the cropping criterion being a criterion for the size and location of the cropped digital image; combining the source digital images to form a composite digital image; selecting the cropping region of the composite digital image according to the cropping criterion, said cropping region being a rectangular region having aspect ratio L:H, and having size and location determined by the cropping criterion; and, cropping the composite digital image to the cropping region to form a cropped digital image.

25 Claims, 10 Drawing Sheets



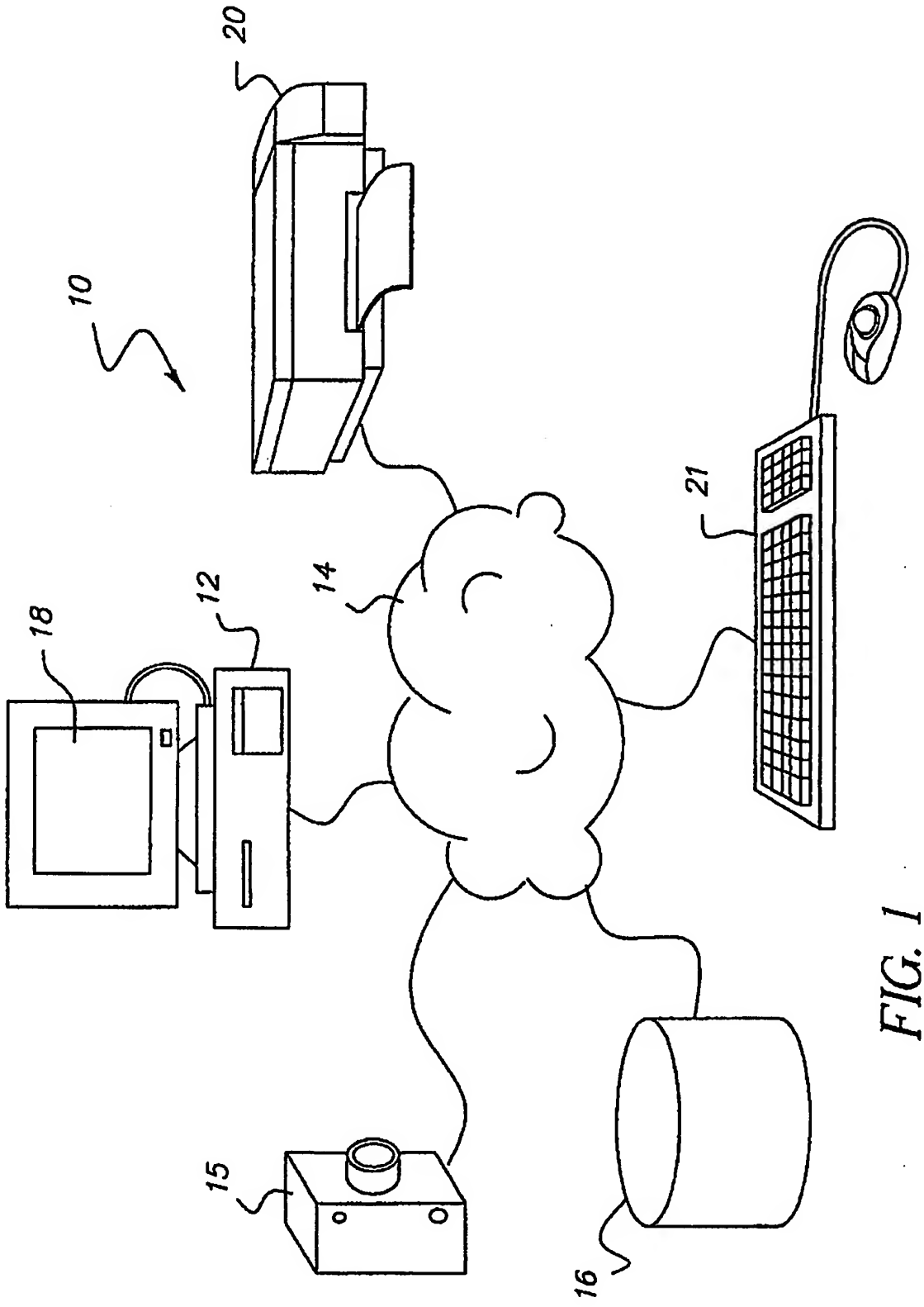


FIG. 1

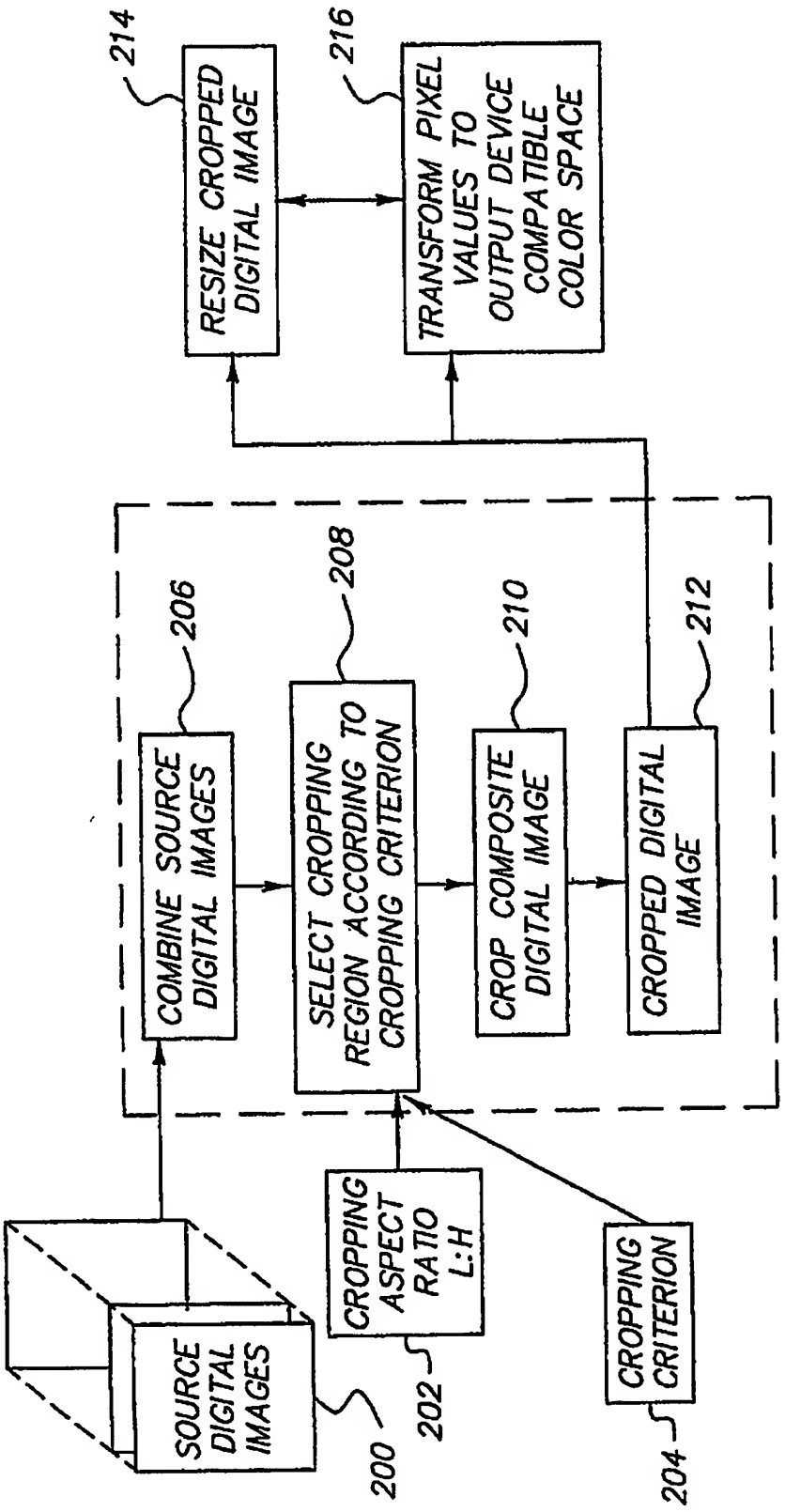

SOURCE DIGITAL IMAGES
200
CROPPING ASPECT RATIO L:H
202
CROPPING CRITERION
204
COMBINE SOURCE DIGITAL IMAGES
206
SELECT CROPPING REGION ACCORDING TO CROPPING CRITERION
208
CROP COMPOSITE DIGITAL IMAGE
210
CROPPED DIGITAL IMAGE
212
RESIZE CROPPED DIGITAL IMAGE
214
TRANSFORM PIXEL VALUES TO OUTPUT DEVICE COMPATIBLE COLOR SPACE
216

FIG. 2

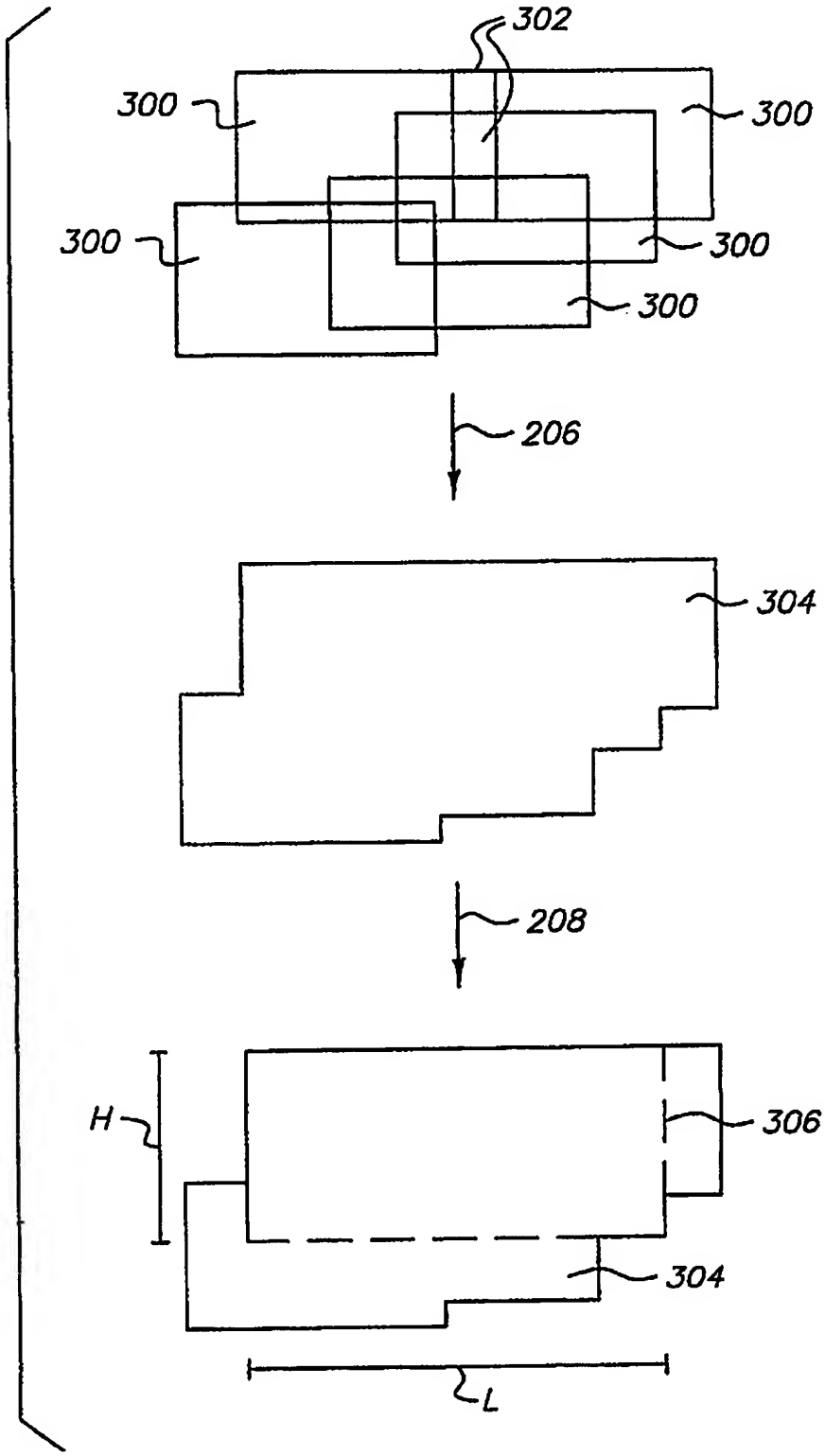


FIG. 3

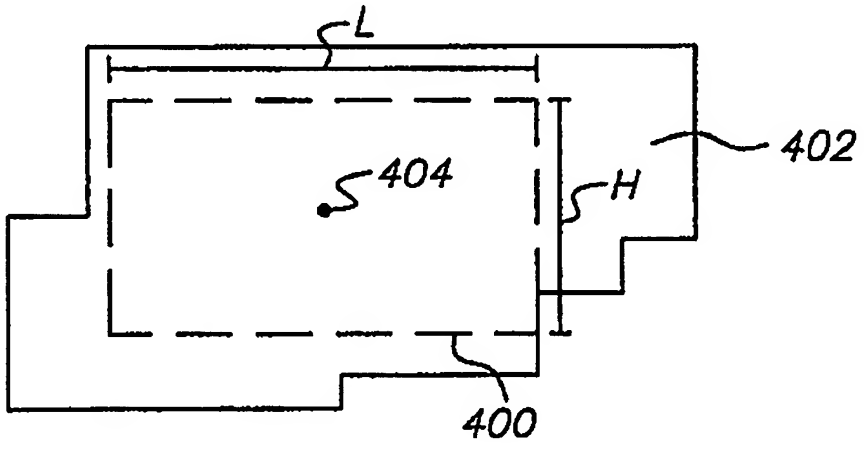


FIG. 4

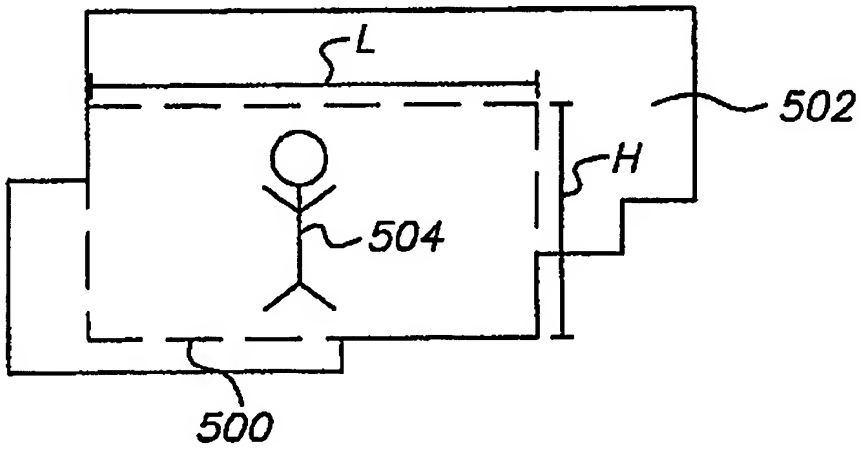


FIG. 5

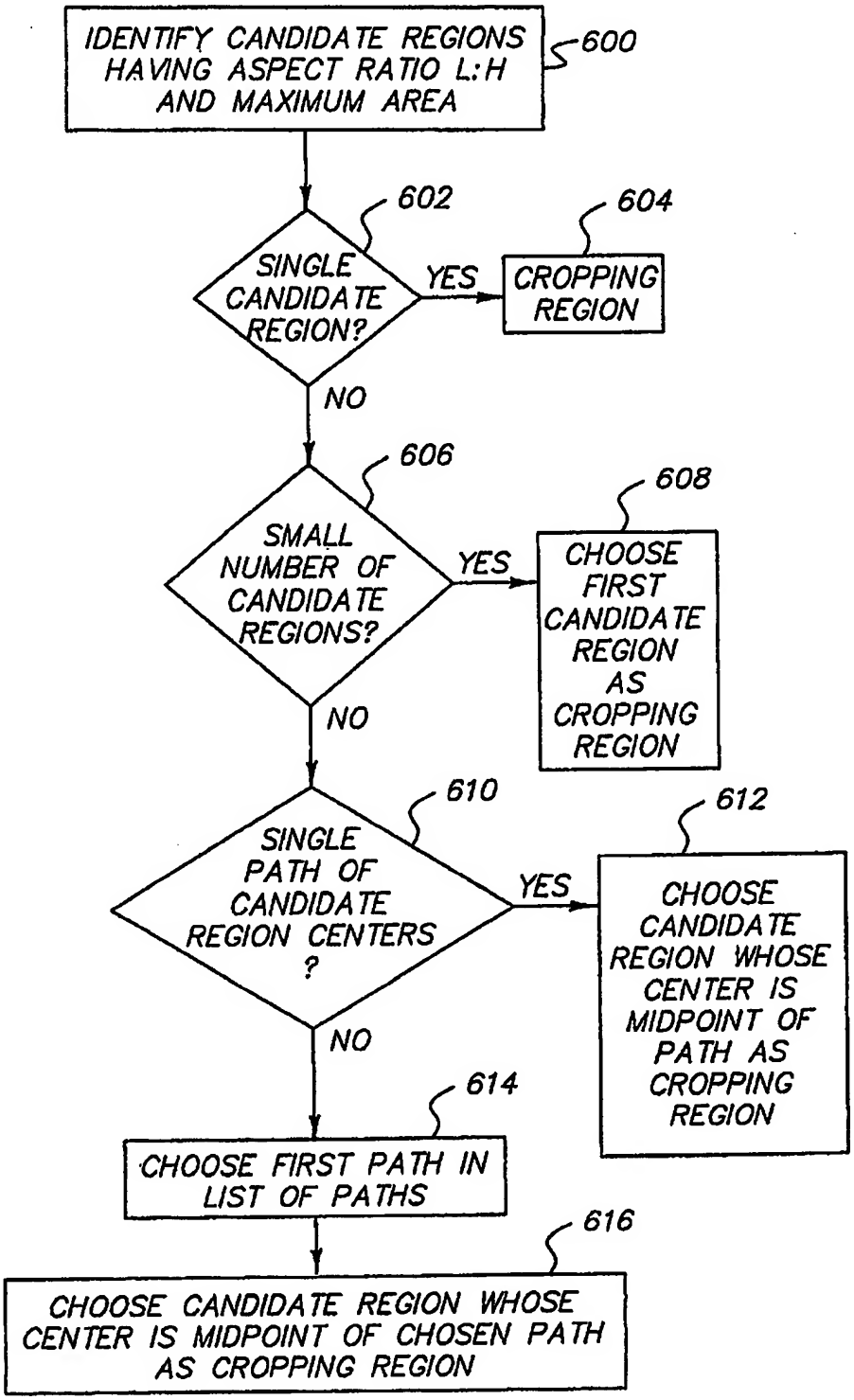

IDENTIFY CANDIDATE REGIONS HAVING ASPECT RATIO L:H AND MAXIMUM AREA
600
602
SINGLE CANDIDATE REGION?
YES
604
CROPPING REGION
NO
606
SMALL NUMBER OF CANDIDATE REGIONS?
YES
608
CHOOSE FIRST CANDIDATE REGION AS CROPPING REGION
NO
610
SINGLE PATH OF CANDIDATE REGION CENTERS ?
YES
612
CHOOSE CANDIDATE REGION WHOSE CENTER IS MIDPOINT OF PATH AS CROPPING REGION
NO
614
CHOOSE FIRST PATH IN LIST OF PATHS
616
CHOOSE CANDIDATE REGION WHOSE CENTER IS MIDPOINT OF CHOSEN PATH AS CROPPING REGION

FIG. 6

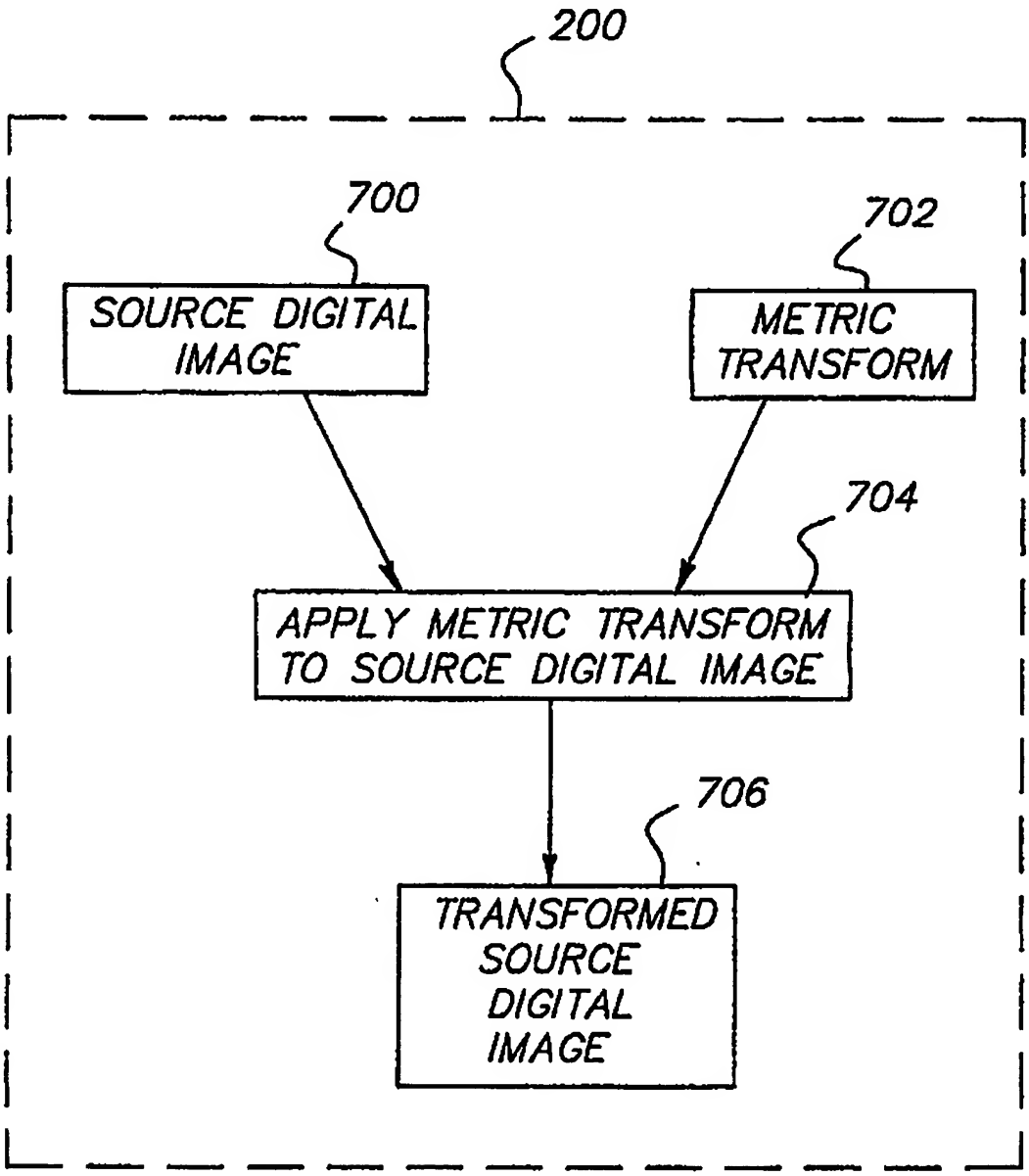

200
700
SOURCE DIGITAL IMAGE
702
METRIC TRANSFORM
704
APPLY METRIC TRANSFORM TO SOURCE DIGITAL IMAGE
706
TRANSFORMED SOURCE DIGITAL IMAGE

FIG. 7

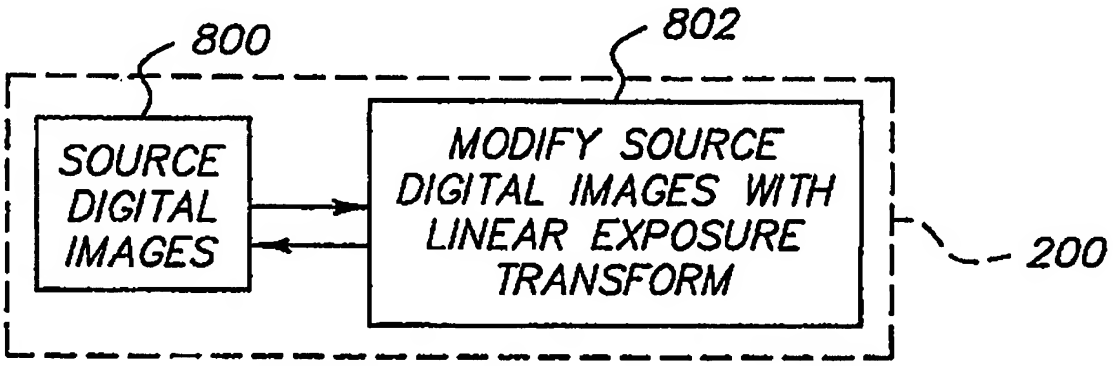

800
802
SOURCE DIGITAL IMAGES
MODIFY SOURCE DIGITAL IMAGES WITH LINEAR EXPOSURE TRANSFORM
200

FIG. 8A

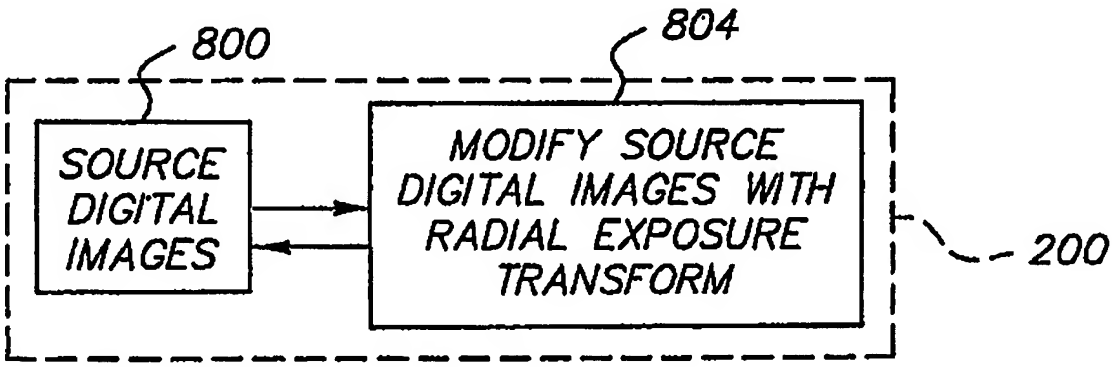

800
804
SOURCE DIGITAL IMAGES
MODIFY SOURCE DIGITAL IMAGES WITH RADIAL EXPOSURE TRANSFORM
200

FIG. 8B

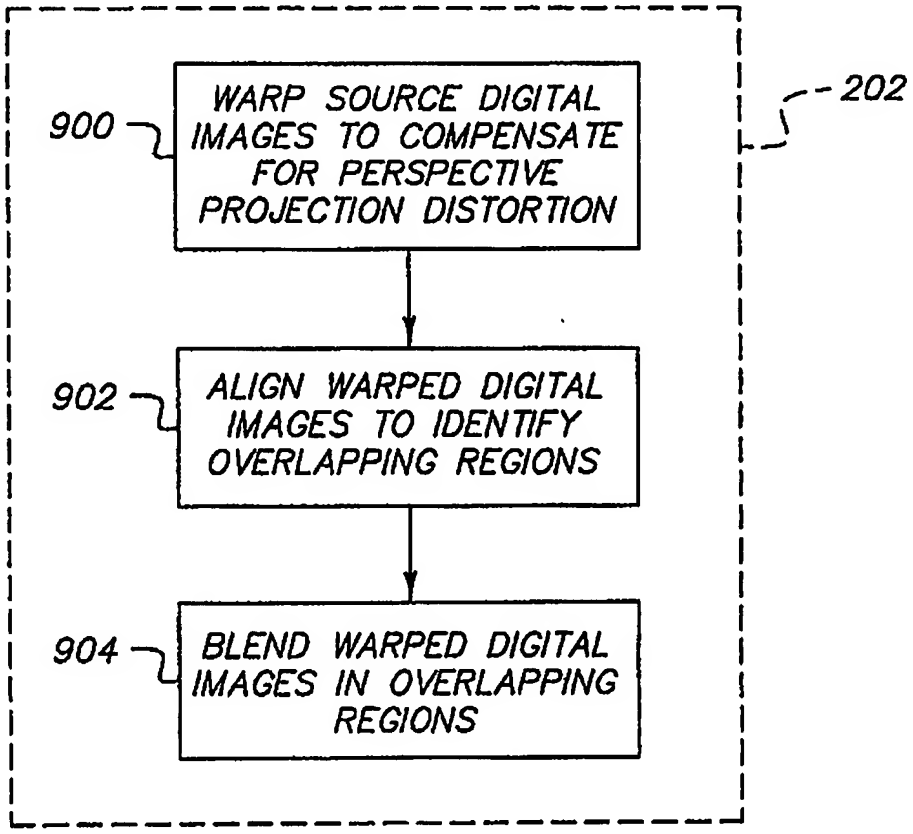

900
WARP SOURCE DIGITAL IMAGES TO COMPENSATE FOR PERSPECTIVE PROJECTION DISTORTION
202
902
ALIGN WARPED DIGITAL IMAGES TO IDENTIFY OVERLAPPING REGIONS
904
BLEND WARPED DIGITAL IMAGES IN OVERLAPPING REGIONS

FIG. 9

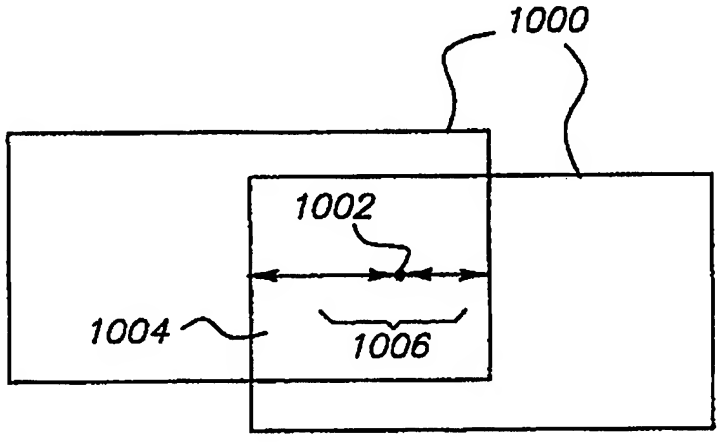

1000
1002
1004
1006

FIG. 10

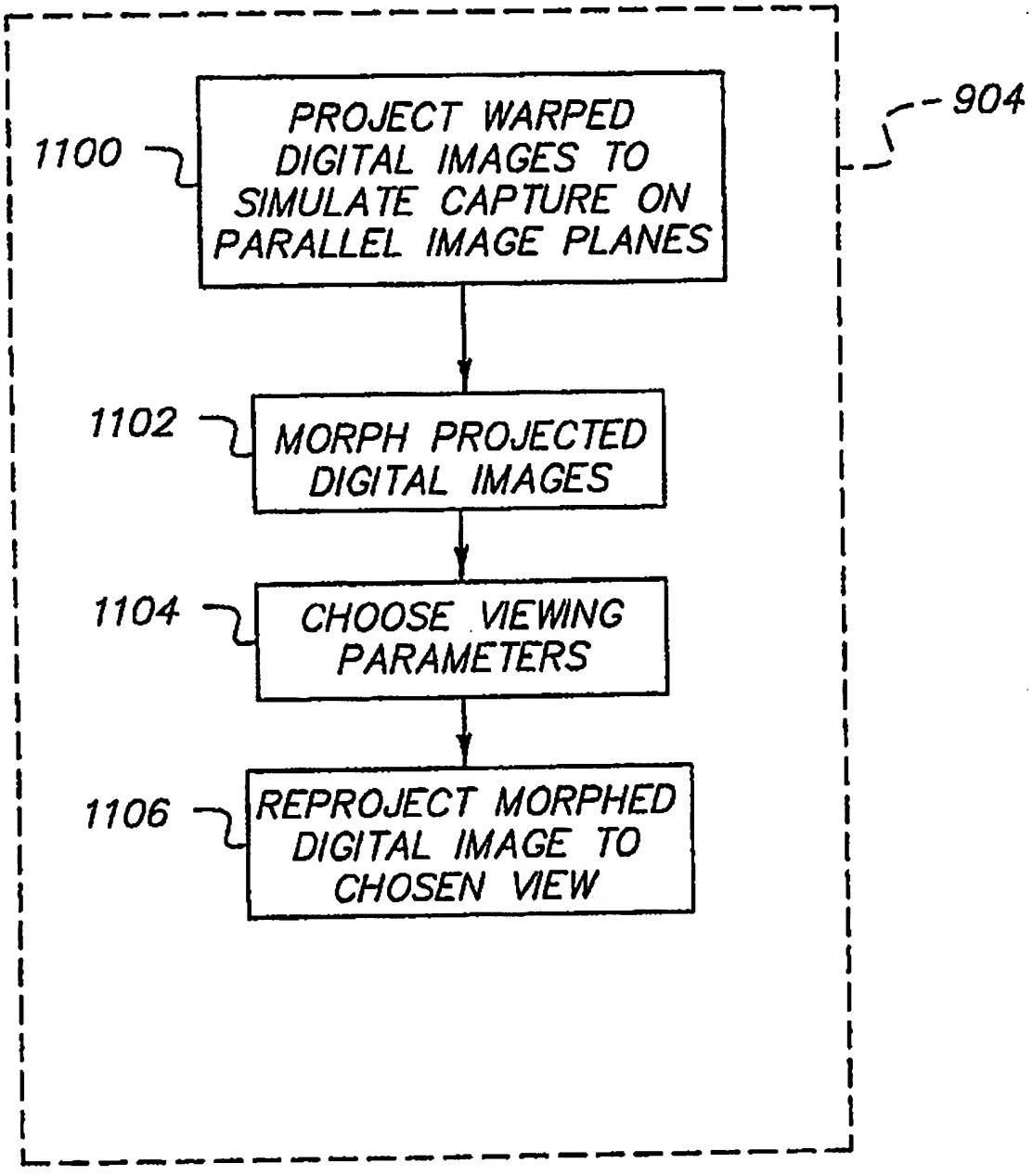

904
1100
PROJECT WARPED DIGITAL IMAGES TO SIMULATE CAPTURE ON PARALLEL IMAGE PLANES
1102
MORPH PROJECTED DIGITAL IMAGES
1104
CHOOSE VIEWING PARAMETERS
1106
REPROJECT MORPHED DIGITAL IMAGE TO CHOSEN VIEW

FIG. 11

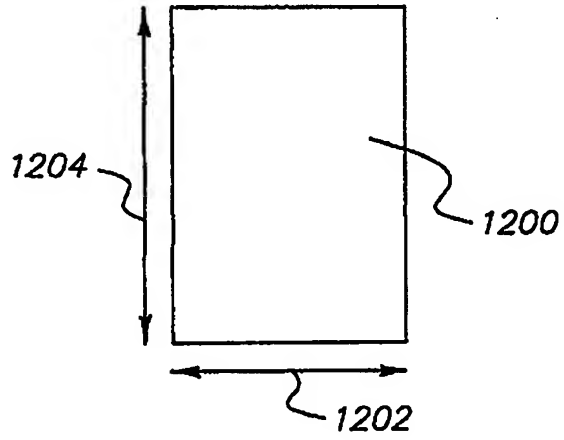


FIG. 12A

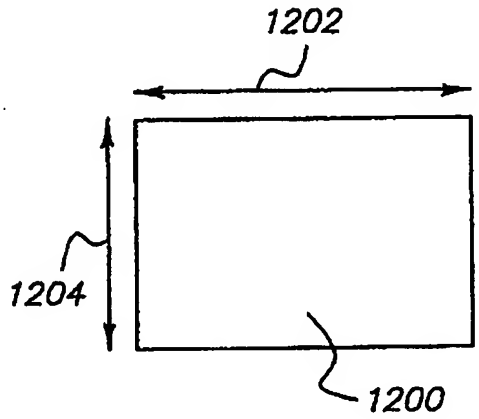


FIG. 12B

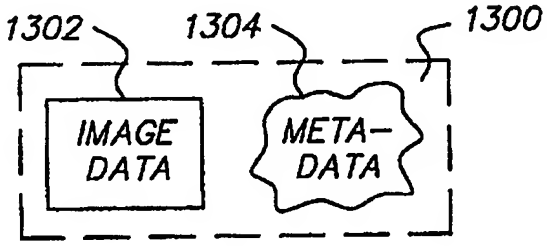


FIG. 13A

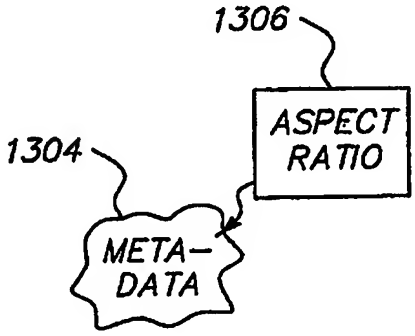


FIG. 13B